Bhumika

PhD Senior Research Scholar, IIT Jodhpur

Spatio-temporal Modeling, Federated Learning, Graph learning, AI for Social Good

bhumika.1@iitj.ac.in Google scholar

Education

Jan 2020 – Present
Indian Institute of Technology Jodhpur, Rajasthan, India
Senior PhD Student, Department of Computer Science and Engineering
- Thesis Title: Spatio-Temporal Anomaly Analytics in Cityspaces.
- Supervision: Dr. Debasis Das
- Coursework: 8.7/10 CGPA

Jul 2017 – Jun 2019
Centre for Development of Advance Computing, Noida, Uttar Pradesh, India
M.Tech. in Computer Science and Engineering
- Dissertation: Automatic Short Answer Grading.
- Supervision: Dr. Kalpana Johari
- University: Guru Gobind Singh Indraprastha University - Delhi (India)
- Overall Grade: 9.02/10 CGPA (Ranked 1st in class)

Oct 2013 – Sep 2016
Atal Bihari Vajpayee Government Institute of Engg. & Technology, Himachal Pradesh, India
B.Tech. in Computer Science and Engineering
- Major Project: College Bulletin Board
- Supervision: Mr. Ravi Kumar
- University: Himachal Pradesh Technical University
- Overall Percentage: 77.9% (Distinction)

Oct 2009 – Feb 2012
Government Polytechnic Sundernagar, Himachal Pradesh, India
Diploma in Computer Engineering
- Major Project: Web Portal for Online Counseling
- University: Himachal Pradesh Takniki Shiksha Board - Dharamshala
- Overall Percentage: 77.2% (Distinction)

Dec 2008
Matriculation
Major Subjects: Mathematics, Science, Information Technology, Hindi, English, Social Science,
- School: Saraswati Vidya Mandir High School Dalash - Kullu, Himachal Pradesh.
- Board: Himachal Pradesh Board of School Education Dharamshala
- Overall Percentage: 87% (Received Merit Certificate for holding 58th Position in State)

Research/Industry Experience

Feb - March 2024
University of Grenoble Alpes, France
Visiting Researcher
- Project: Distributed Spatio-temporal Learning in Urban Areas
- Supervisor: Prof. Phillipe Lalanda

Jan 2022 – June 2022
Samsung India Electronics Pvt. Ltd. (SEL Division), Noida (India)
Associate Engineer
- Responsibilities: Quality Assurance of Mobile Phone, Black Box Testing
- Manager: Er. Antim Kumar and Er. Nancy Gupta

Teaching Experience

Jan 2020 – Present **Indian Institute of Technology Jodhpur, Rajasthan**
Teaching Assistant, Department of Computer Science and Engineering
Classes: Security and Applications (Undergraduate + Postgraduate) [Outstanding TA Award], Edge and Fog Computing (Postgraduate), Blockchain and its Applications (Postgraduate) [Outstanding TA award], Distributed Databases (Postgraduate), Algorithms and Data Structures (Undergraduate), Artificial Intelligence (Postgraduate)

July 2019 – Dec 2019 **National Institute of Technology (NIT), Hamirpur (H.P.)**
Guest Faculty, Department of Computer Science and Engineering
- Classes: Game Theory, Wireless Sensor Network (Dual Degree)
- Lab: Computer Graphics (Undergraduate)

Jan 2019 – May 2019 **Centre for Development of Advanced Computing, Noida, Uttar Pradesh, India**
Teaching Assistant, Department of Computer Science and Engineering
Lab: Computer Graphics (Postgraduate)

Publications

2024

1. Sandip Kumar, Pragati Singha, **Bhumika**, and Debasis Das “Co-Move: Covid-19 and Inter-region Human Mobility Analysis and Prediction”, IEEE Transactions on Computational Social Systems (TCSS), 2024. *Impact Factor: 4.5*

2023

2. Nishit Bhardwaj, Anupriya Pal, **Bhumika**, and Debasis Das "Adaptive Context based Road Accident Risk Prediction using Spatio-temporal Deep Learning", IEEE Transactions on Artificial Intelligence (TAI), 2023. *Cite score: 7.7*
3. Vyas, Jayant, **Bhumika**, Debasis Das, and Santanu Chaudhury. "Federated learning based driver recommendation for next generation transportation system." Expert Systems with Applications, 2023. *Impact Factor: 8.665*

2022

4. Jayant Vyas, **Bhumika**, Debasis Das, and Sajal K. Das. "Dr. MTL: Driver Recommendation using Federated Multi-Task Learning". In IEEE 98th Vehicular Technology Conference (VTC2023-Fall), Hong Kong. *Core Ranking: B*
5. **Bhumika**, and Debasis Das. "Deep Learning Based Urban Anomaly Prediction from Spatiotemporal Data." In Joint European Conference on Machine Learning and Knowledge Discovery in Databases, pp. 242-257. Cham: Springer International Publishing, 2022. *Core Ranking: A*
6. **Bhumika**, and Debasis Das. "MARRS: A Framework for multi-objective risk-aware route recommendation using Multitask-Transformer." In Proceedings of the 16th ACM Conference on Recommender Systems, pp. 360-368. 2022. *Core Ranking: A*
7. **Bhumika**, and Debasis Das. "UApredictor: Urban Anomaly Prediction from Spatial-Temporal Data using Graph Transformer Neural Network." In 2022 International Joint Conference on Neural Networks (IJCNN), pp. 1-8. IEEE, 2022. *Core Ranking: B*
8. **Bhumika**, Debasis Das, and Sajal K. Das. "RsSafe: Personalized Driver Behavior Prediction for Safe Driving." In 2022 International Joint Conference on Neural Networks (IJCNN), pp. 1-8. IEEE, 2022. *Core Ranking: B*
9. **Bhumika,** Jayant Vyas, and Debasis Das. "Stress-Aware Recommendation for Safe Driving using MTL-ConvLSTM." In 2022 IEEE 25th International Conference on Intelligent Transportation Systems (ITSC), pp. 3490-3495. IEEE, 2022.
10. Rigoni Giulio, Cristina M. Pinotti, **Bhumika**, Debasis Das, and Sajal K. Das. "Delivery with UAVs: a simulated dataset via ATS". In 2022 IEEE 95th Vehicular Technology Conference (VTC2022-Spring) *Core Ranking: B*
11. Vyas, Jayant, Nishit Bhardwaj, **Bhumika** and Debasis Das. "TransDBC: Transformer for Multivariate Time-Series based Driver Behavior Classification." In 2022 International Joint Conference on Neural Networks (IJCNN), pp. 1-8. IEEE, 2022. *Core Ranking: B*

12. Ankur Nahar, Lokendra Vishwakarma, **Bhumika**, Debasis Das "MetoidS: Hybrid K-Medoids-Meta Heuristic Clustering-Based Routing Optimization in Vehicular Ad-Hoc Networks" in 2022 IEEE 95th Vehicular Technology Conference (VTC2022-Spring) *Core Ranking: B*
13. **Bhumika**, and Debasis Das "ANOM-DGCN: Detection of Anomalies in Dynamic Networks using Deviated Graph Convolution Network" in 2022 International Wireless Communications and Mobile Computing (IWCMC) *Core Ranking: B*

Publications Under Submission or Preparation

2025

1. **Bhumika**, Phillipe Lalanda, German Vega, Debasis Das, "Federated Perspective of Spatio-temporal Crime Prediction with Skewed and Sparse Data", Elsevier Neurocomputing 2025 (Under Submission)
2. **Bhumika**, Phillipe Lalanda, Debasis Das, "Graph Structured Personalized Federated Learning for Spatio-temporal Crime Prediction with Skewed Data", IEEE TCSS 2025 (Under Submission)
3. **Bhumika**, Debasis Das, "Citywide Spatio-temporal Incident Prediction with Long-Tailed Spatial Distribution", TKDE 2025 (Under Preparation)
4. Shruti Sureshan, **Bhumika**, and Debasis Das, "Leveraging Relation Networks for Few-Shot Network Anomaly Detection", ICONIP 2025 (Under Submission)
5. Nikhil Dwivedi, **Bhumika**, and Debasis Das, "Earthquake Severity and Probability Prediction using Deep Multi-Output Learning", ICONIP 2025 (Under Submission)
6. Jayant Vyas, **Bhumika**, and Debasis Das, "Escape-Route: Dynamic Spatiotemporal Graph Convolution for Evacuation Recommendation", IEEE ITS 2025 (Under Submission)

Patent Under Submission

2024

1. Jayant Vyas, Bhumika, Debasis Das, and Santanu Chaudhury, "Intelligent Driving-Induced Stress Detection System", 2024. (Indian Patent Published, Application No: 202411060073)

Scholarships & Grants

Nov 2020 – Dec 2025 **Ministry of Education (MoE), Govt of India.**
PhD Fellowship

Nov 2024 **Registration Grant for attending CODS-COMAD held in IIT Jodhpur**
Special Registration Grant

Feb 2024 **Registration Grant for attending PerCom**
Volunteer in PerCom

Nov 2023 **ACM India Research Facilitation Grant (RFG)**
Extra page charges for Journal article

July 2023 **ACM India Grad Cohort**
Travel Grant

Dec 2022 **Indian Symposium on Machine Learning (IndoML) organized by IIT Gandhinagar**
Received Registration & Travel Grant

Sept 2022 ***ECML - Principles and Practice of Knowledge Discovery in Databases***
Free Ph.D. Paper Registration

Aug 2017 – May 2019 **Ministry of Education (MoE), Govt of India.**
AICTE PG GRANT SCHEME (GATE Scholarship)

Achievements

1. Received ***Outstanding TA award*** for course “Blockchain” and "Security and its Applications" from the Department of Computer Science & Engineering (2023, 2022).
2. Selected as ***Notable Participants*** in national level IITB-FOSSEE Mapathon 2023.
3. Selected for attending the ***summer school*** in Climate Change AI Summer School 2023. June 23-July 27, 2023 (Virtual Mode)
4. Selected to present paper at ECML-PkDD 2022 in the **PhD Forum**.
5. Project ***proposal accepted in Smart Cities Innovation Competition, (SCIC)*** supported by Smart Cities Innovation Competition Committee, International Society for Urban Informatics (ISUI), 2022
6. Selected for ***Research Week with Google***, organized by Google Research India, from Feb 8 to Feb 11, 2022
7. ***Winner of Student’s Pitch Competition*** held as part of Industry Day 2021 powered by IIT Jodhpur.
8. ***Second Position in Tech Ideation Competition*** "Idea for India" on the occasion of Independence Day 2021, organized by Board of Co-Curricular Affairs IIT Jodhpur for our idea "Safarnama Beyond the shortest route"
9. Selected to attend ***Graduate Symposium***, organized by Google Research India in the Asia-Pacific region, from April 7 to April 10, 2021
10. Research article selected for *publication in* ***TechScape*** entitled “Personalized Driver Behavior Prediction for Safe Driving using Smartphone”. The Science, Technology and Education Journal of IIT Jodhpur. Vol.1, Issue 2, December 2020.
11. Qualified ***GATE*** (Graduate Aptitude Test) 2017 and 2018, ***UGC NET*** (University Grants Commission National Eligibility Test) 2018 and 2019, **HPSET** (H.P. State Eligibility Test) 2019 - Computer Science and Application

Coursework

Offline: Machine Learning-1, Natural Language Processing, Vehicular Ad-Hoc Network, Security & applications
Online: Deep Learning, Urban Computing, Machine Learning with Graphs

Academic Services

Reviewer

1. Journals: IEEE Transactions on Artificial Intelligence
2. Conferences: IEEE ITSC, 2021, 2022, 2023, 2024, 2025

Organization

1. Organized ***Hour of Code*** for School children under ACM Student Chapter IIT Jodhpur 2021.
2. Organized ***Student Research Symposium*** under ACM Student Chapter IIT Jodhpur 2022.
3. Served as a ***Technical Head*** in organizing Cultural cum TechFest "Genesis" 2016.

Others

1. Served as a ***member (WebMaster)*** of ACM Student Chapter IIT Jodhpur between Aug 2021- Aug 2022.
2. Maintained the ***official Vanet lab Website*** (Jan 2023-Dec 2023)
3. Served as a **class representative** in undergraduation (2014-2016)

Mentoring

Undergraduate: Sandip (NinjaKart), Pragati Sinha (Google), VK Santosh
Postgraduate: Nishit Bhardwaj (Samsung R & D Bangalore), Shruti Sureshan (Accenture Japan)

Software

Languages: Python, C, Java
Tools & Technologies: BlueSky simulator, QGIS, Weka, NS2, Raspberry pi, LATEX, Html, CSS, Java Script
Libraries: Scikit learn, pyTorch, pandas, geopandas, matplotlib

Extracurricular

1. Attended **symposium** on “AI for Smart Mobility” organized by School of AI and Data Science, IIT Jodhpur 2025.
2. Attended **PhD Conclave** on “Navigating Ph.D. and Beyond” organized by IIT Jodhpur in Jan 2025.

3. Attended a workshop on ***Patent Landscaping*** organized by IIT Jodhpur in Sept 2023.
4. Attended ***IoT and Applications*** Workshop organized by IoT - IDRP, IIT JODHPUR Aug 2023.
5. Presented a ***poster*** at Industry Day organized by IIT Jodhpur 2023.
6. Presented a ***poster*** at IndoML organized by IIT Gandhinagar 2022.
7. Participated in the ***Science of Self Discovery*** Workshop in 2022.
8. Attended an ***ACM IKDD Event Collocated With KDD2021*** on title "Data Science In India" in Aug 2021.
9. Attended ***ACM W India Grad Cohort Workshop*** in 2020, 2021, 2023.
10. Second Position in ***Group singing*** in the fest "COLOSSUS-2019" held from 27th Feb- 1st March 2019.
11. Participated in ***Kho-kho*** in the fest "COLOSSUS-2019" held from 27th Feb- 1st March 2019.

Talks or Paper Presentations at Conferences

1. *Bhumika*, and Debasis Das. "Deep Learning Based Urban Anomaly Prediction from Spatiotemporal Data." In Joint European Conference on Machine Learning and Knowledge Discovery in Databases, pp. 242-257. Cham: Springer International Publishing, 2022. *(Contributed Talk)*
2. *Bhumika*, and Debasis Das. "MARRS: A Framework for multi-objective risk-aware route recommendation using Multitask-Transformer." In Proceedings of the 16th ACM Conference on Recommender Systems, pp. 360-368. 2022. *(Contributed Talk)*
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5. *Bhumika*, Jayant Vyas, and Debasis Das. "Stress-Aware Recommendation for Safe Driving using MTL-ConvLSTM." In 2022 IEEE 25th International Conference on Intelligent Transportation Systems (ITSC), pp. 3490-3495. IEEE, 2022. *(Contributed Talk)*
6. Rigoni Giulio, Cristina M. Pinotti, *Bhumika*, Debasis Das, and Sajal K. Das. "Delivery with UAVs: a simulated dataset via ATS". In 2022 IEEE 95th Vehicular Technology Conference (VTC2022-Spring) *(Contributed Talk)*

References

1. ***Dr. Debasis Das (PhD Supervisor)***
   Associate Professor
   Department of Computer Science and Engineering, Indian Institute of Technology Jodhpur
   Email: debasis@iitj.ac.in Phone:(+91 291) 280 1261

2. ***Dr. Sajal K. Das (Research Collaborator)***
   Professor and Daniel St. Clair Endowed Chair
   Department of Computer Science, 315 Computer Science Bldg.
   Missouri University of Science and Technology, Rolla, MO 65409, US
   Email: sdas@mst.edu

3. **Dr. Philippe Lalanda** ***(Research Collaborator)***
   Professor in Computer Science
   University Grenoble-Alpes (UGA), 38401 Saint-Martin-d'Hères, France
   Email: philippe.lalanda@univ-grenoble-alpes.fr